

## PATENTS SUMMARY

04/23/99

Page 1

Country : China

Patent #: 1,115,212 A

Index#: 5666

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Issue Date: 01/24/96

Assignee: Inventor

Date of Application: 07/19/94

Title:

METHOD OF MANUFACTURING CHEWING GUM AND BUBBLE GUM FOR  
PREVENTING AND  
TREATING DENTAL CARIES AND PERIODONTITIS

Desc.:

A method of manufacturing chewing gum for preventing and treating dental caries and periodontitis and the gum so produced are claimed. The chewing gum is made with an extract of magnolia bark, licorice root, Chinese gall, Chinese cinnamon bark and low grade tea. Details are given for preparing the extract which has broad-spectrum bacteriostatic action. The chewing gum is made with xylitol as the sweetener to prevent dental caries. It may also contain stevioside sweetener.

Key Words:

10 CHEWING GUM  
17 Sugarless (Gum)  
20 Anticaries/Antiplaque (Gum)  
25 Pharmaceutical  
63 Xylitol  
177 Stevia Sweeteners  
400 FLAVORS/FRAGRANCES  
402 Natural  
466 Spices/Herbs  
486 Solvents  
504 Mixing/Gum Manufacture  
525 Chemical Synthesis/Preparation  
600 ORAL HEALTH  
601 Anticaries/Antiplaque/Anticalculus  
602 Periodontal  
603 Antibiotic  
605 Non-cariogenic Sweetener or Product  
750 Independent Inventor  
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## RECORD COPY CENTRAL FILE

### METHOD OF MANUFACTURING CHEWING GUM AND BUBBLE GUM FOR PREVENTING AND TREATING DENTAL CARIES AND PERIODONTITIS

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Translated from Chinese

QB/qb

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02/22/98

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[19] Patent Office of the People's Republic of China

[11] Laid-Open Number: CN 1115212A

[12] LAID-OPEN PATENT APPLICATION

[21] Application Number: 94116766.6

[43] Laid-Open date: January 24, 1996

[51] Int.Cl<sup>6</sup>: A23G 3/30  
A61K 9/68 A61K 35/78

[22] Application Date: July 19, 1994

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Number of pages in Claim: 2

Number of pages in Specification: 3

Number of pages of Figures: 0

[54] Title: **METHOD OF MANUFACTURING CHEWING GUM AND BUBBLE GUM FOR PREVENTING AND TREATING DENTAL CARIES AND PERIODONTITIS**

[57] *Abstract:*

*This invention relates to a manufacturing method of producing a kind of chewing gum and bubble gum for preventing and treating dental caries and periodontitis from raw materials including root of licorice (legume family) and bark of magnolia (magnoliaceae family), Chinese gall (aphididae family), Chinese cinnamon (Cortex cinnamomi, cinnamomum family and leftover bits of tea, which are extracted in a scientific way. The extract obtained has xylitol or stevioside added to it as the sweetener to replace the sucrose and glucose used in the conventional process.*

#### CLAIMS

1. Manufacturing method of chewing (bubble) gum, characterized by the fact that the raw materials used for making the chewing gum include magnolia bark (including *Magnolia officinalis* and *M. obovata*), licorice root (*Radix glycyrrhizae*, 18 kinds including *Glycyrrhiza uralensis* Fisch, *Glycyrrhiza glabra* L etc.), Chinese gall (*Melaphis chinensis* (bell) baker and gall of *Melaphis peltan* Tsai et Tang), Chinese cinnamon bark (*Cortex cinnamomi*, including *Cinnamomum chingii* metcalf, *Cinnamomum japonicum* Sieb, *Cinnamomum burmannii* (Meis) BI, *Cinnamomum wilsonii* Gamble and *Cinnamomum cassia* Presl) and tea (*Camellia sinensis* O. Ktze), and the manufacturing process consists of drying the

raw materials, grinding the product (optional) and extracting it 1-6 times with organic solvent having an  $\epsilon$  value of 26-34 at a pressure of 1-2 atmospheres (manometric pressure) and a temperature of 1-130°C, filtering the extract, recovering the filtrate with solvent, and drying at a temperature of 80°C to obtain the additive for the purpose of prevention and treatment.

2. Manufacturing method in accordance with Claim 1, characterized by the fact that the organic solvent used is methanol, the temperature for extraction is 1-105°C and the pressure is 1-5 atmospheres.

3. Manufacturing method in accordance with Claim 1, characterized by the fact that the organic solvent applied for Chinese gall extraction is ethanol, the extraction temperature is 1-120°C, and the pressure is 0.1-5 atmospheres.

4. Manufacturing method in accordance with Claim 1, characterized by the fact that the solvent used for tea extraction is water, the extraction temperature is 10-100°C, the pressure is one normal atmosphere, the precipitant is  $AlCl_3$ , and the extracting agent is acetic ester.

5. Manufacturing method in accordance with Claim 4, characterized by the process wherein hot water tea extractant passes DA-201 macroporous resin-packed column, the washing water merges with effluent, the confluence is washed again in H103 macroporous resin-packed column, after washing, the two columns are eluted with 25%, 50%, 75% and 95% ethanol and acetone, respectively, and the resulting product is condensed under a partial vacuum, then freeze-dried or spray-dried.

6. Manufacturing method in accordance with Claim 1, characterized by the fact that the preventive ingredients used for making the inventive product can be single flavor extract or a blend of Chinese cinnamon bark (*Cortex cinnamomi*) extract and other extracts.

7. Manufacturing method in accordance with Claim 1, characterized by a process wherein the Chinese cinnamon bark (*Cortex cinnamomi*) is extracted directly 1-3 times at an extraction temperature of 40-70°C with 50-100°C water or 1-4 times with organic solvent having an  $\epsilon$  value of less than 21, after which the extract is de-oiled and its residue extracted 1-3 times at a temperature of 10-120°C with 30%-70% ethanol.

8. Chewing gum or bubble gum characterized by the fact that it contains xylitol as its active ingredient for prevention and treatment of disease and for sweetening, and stevioside as an ingredient for sweetening and sweetness adjustment, thus replacing the sucrose and glucose used in conventional production.

## SPECIFICATIONS

### METHOD OF MANUFACTURING CHEWING GUM AND BUBBLE GUM FOR PREVENTING AND TREATING DENTAL CARIES AND PERIODONTITIS

This invention relates to a manufacturing method of producing a chewing gum and bubble gum for preventing and treating dental caries and periodontitis from raw materials including root of licorice (legume family) and magnolia bark of the magnoliaceae family, Chinese gall (aphididae family), Chinese cinnamon (*Cortex cinnamomi*) of the family cinnamomum and bits of tea seconds, which are extracted scientifically. The extract obtained has xylitol or stevioside added to it as the sweetener to replace the cane sugar and glucose used in the traditional process.

In Finland, an experiment was conducted on the prevention of dental caries. The medical workers in this experiment used xylitol to replace conventional cane sugar in chewing gums that are popular with children. They found that children who chewed 2 sticks of xylitol-containing chewing gum daily had a

dental caries incidence 30% lower than those who did not chew the gum each day, while those who chewed 3 sticks of the gum had an incidence 60% lower than those who did not chew it (reported in *China Health Information Newspaper*, June 13, 1987).

The objective of this invention is to propose a manufacturing method for a new type of therapeutic chewing (bubble) gum that can not only prevent but also treat dental caries and periodontitis.

The objective of this invention can be achieved by using a method such as described below.

First a powder is prepared by grinding magnolia bark, Chinese gall and licorice root (*Radix glycyrrhizae*). The powder is then refluxed 2 or 3 times with ethanol or methanol at a duration of less than 6 hours per reflux, at a reflux temperature not higher than 120°C and a pressure of no more than 4 atm. The extract is then filtered and condensed to a dry cream, then ground to powder for use; another product is prepared by a method wherein Chinese cinnamon bark (*Cortex cinnamomi*) is ground to powder, the powder is refluxed for 24 hours using organic solvent whose  $\epsilon$  value is higher than 26, the reflux temperature not higher than 80°C, and the reflux pressure not higher than 2 atmospheres; the extracting solution from the reflux is then filtered and condensed to dry cream and ground to powder for use. A macrocrystalline preparation is prepared by a method wherein 100°C boiling water is added to middle or low grade tea dust, which is agitated and extracted 1-3 times, with each agitation and extraction lasting less than 1 hours, the amount of water being 10 times the amount of tea dust; the extract, after being filtered, has an appropriate amount of  $AlCl_3$ , added; its pH value is adjusted with 1 mol/L  $NaHCO_3$ , and after sedimentation ceases, separation is done by centrifugalization; the sediment is then dissolved in 4-6 mol/L hydrochloric acid and extracted with acetic ester, condensed and de-solvented, then vacuum dried to obtain macrocrystals with an off-white color. The tea extract passes through DA-201 macroporous resin-packed column, and the washing water merges with effluent. The confluence is then washed again with an H103 macroporous resin-in column. After washing, the 2 columns are gradient-eluted using 25%, 50%, 75%, 95% ethanol and acetone respectively, yielding 5 sub-effluxes, which are then combined and spray dried to obtain the dry product.

At this stage, various types of sweet chewing (bubble) gums can be made by using 50-4000 g of dry powder of above 5 extracts, 1000-4000 g of commercial xylitol and 10-80 g of stevioside, adding softener, antioxidant, starch powder, gum base and food-approved essential oils in an amount appropriate for use in the production of a thousand sticks of chewing gum, then blending the product to obtain the chewing gum. The chewing gum thus produced has 5 major advantages over chewing gum containing only xylitol as the additive:

1. The bacteriostatic efficacy is extremely high. For example, the methanol extract of the licorice root in a concentration of 50-200 mg/ml, has a 100% inhibition ratio against *Streptococcus mutans* and GTF-catalyzed glucan synthesis (Namba T. et al, *Shoyakugaku Zasshi*, 1985, 39 (2): 146)
2. The bacteriostatic action acts in within a short time. For example, the methanol extract of magnolia bark can kill the *Streptococcus mutans* in the oral cavity within 2½ minutes, and hence can kill cariogenic bacteria by chewing one time with the gum held in the oral cavity for more than 3 minutes (Wu Aiju, etc. *Kouqiang Yixue* [Stomatology] 1987, 7 (1): 1).
3. The bacteriostatic action is broad-spectrum. The above mentioned 5 extracts have wide-ranging effects in inhibiting *Streptococcus mutans* and periodontal bacilli produced in dental plaque.
4. Since the above 5 extracts come from ordinary flavorings, beverages and Chinese medicines, they are safe to the health.
5. The raw materials used for making the 5 extracts are abundant resources. The low-grade tea used in this invention is cheap and the extraction process simple as compared with xylitol extraction, making

the inventive product suitable for mass production. Although the sale price of the product will not exceed that of ordinary commercial chewing gum, it is efficacious in preventing and treating two oral diseases and can effectively protect human oral health, particularly the oral health of most children. It aids in promoting the prevention and treatment of dental caries and periodontitis, which, according to the World Health Organization, is one of the 3 major diseases to be prevented and treated.

Because of the above-mentioned advantages, this invention achieves its purpose, providing a significant technological advance.

The following is an embodiment of the invention:

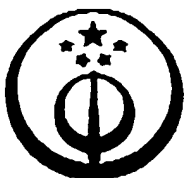
The inventive product can be made in a method wherein 500 g of Chinese cinnamon is ground and extracted 4 times with ethane to remove its essential oil, with each extraction being conducted for 6 hours at a temperature of 65°C. Ten liters of 50% ethanol is added to the residue, which is extracted 3 times for 1 hour each at 80°C. The extract is filtered, condensed under a partial vacuum and dried to obtain 35 dry product.

200 g of magnolia bark and 50 g of licorice root are ground and extracted with methanol 3 times at 80°C for one hour each time. The extract is filtered, condensed under a partial vacuum and dried to obtain 30 g of dry product.

The 65 g of extract obtained as described above is ground. 500 g of xylitol and 2 g of stevioside are added along with softener, antioxidant, starch powder, gum base and food-approved essential oil in amounts appropriate for producing a thousand sticks. Finally the resulting product is sterilized and packaged as in conventional production to obtain the inventive product. The inventive chewing gum is effective in thoroughly and rapidly killing the pathogens that cause dental caries and periodontitis.

[19]中华人民共和国专利局

[11]公开号 CN 1115212A



## [12] 发明专利申请公开说明书

6082

[21]申请号 94116766.6

[51]Int.Cl<sup>6</sup>

A23G 3/30

[43]公开日 1996年1月24日

[22]申请日 94.7.19

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A61K 9/68 A61K 35/78

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[54]发明名称 防治龋齿和牙周炎的口香糖和泡泡糖制  
作方法

[57]摘要

本发明属一种预防和治疗龋齿和牙周炎的口香糖或泡泡糖制作方法,它以桂皮、茶叶等的提取物为防治添加剂,以甜菊糖、木糖醇作甜味剂替代传统制作工艺的蔗糖和葡萄糖,再配以软化剂,抗氧化剂,胶基及香精,生产成薄荷、水果等各种香型的口香糖或泡泡糖,对龋齿和牙周炎进行了预防和治疗,有效地保护了人类尤其是少年儿童们的口腔卫生。

(BJ)第 1456 号